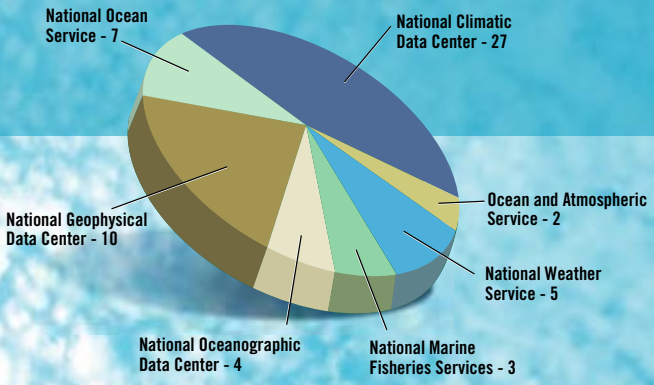
CLIMATE DATABASE MODERNIZATION PROGRAM

ANNUAL REPORT 2007

National Oceanic and Atmospheric Administration
National Environmental Satellite, Data, and Information Service
National Climatic Data Center
Asheville, North Carolina

IT HAS BEEN ESTIMATED THAT WEATHER AND CLIMATE AFFECT ONE-THIRD OF THE GROSS NATIONAL PRODUCT, INCLUDING SEGMENTS OF THE ECONOMY SUCH AS ENERGY, TRANSPORTATION AND WATER RESOURCES. THE ENVIRONMENTAL DATA THAT CDMP IS PUTTING TOGETHER HAS AN IMPORTANT IMPACT.

TOM KARL
Director
National Climatic Data Center



FY07 TASK BY NOAA ORGANIZATION

Total Number of NOAA CDMP projects has reached 58 in 2007

CDMP – Supporting NOAA's Stewardship Commitment

The Climate Database Modernization Program (CDMP) supports the National Oceanic and Atmospheric Administration's (NOAA) mission to collect, integrate, assimilate and effectively manage Earth observations on a global scale, ranging from atmospheric, weather and climate observations to oceanic, coastal, and marine life observations. Many of these holdings, which are part of the U. S. National Archives, were originally recorded on paper, film, and other fragile media, and stored at various NOAA Centers. Prior to CDMP, not only were these valuable data sources mostly unavailable to the scientific community, but storage technology for the archives was not state-of-the-art. Without proper preservation of the media, the information they contained was in danger of being lost forever.

Today, CDMP has greatly improved the preservation of and access to NOAA's holdings by migrating many of these resources to new digital media. Digital images of many of the holdings are now available online, and millions of historic data records have been keyed and integrated into digital databases, with more being added continually. CDMP projects span the full spectrum of NOAA, supporting all five line offices. CDMP also works with U.S. regional climate centers, state climatologists, the U.S. Air Force, the World Meteorological Organization, and foreign meteorological services in Europe, Africa, Asia, and the Americas. These efforts not only benefit NOAA, but researchers and data users throughout the nation and worldwide. The increase in data accessibility and inclusion of these historical data sets into the integrated global databases needed by today's climate and environmental data users validate the CDMP mission: to make major climate and environmental databases available via the World Wide Web.

A CDMP contractor at Information Manufacturing Corporation in Rocket Center, WV prepares a delicate page of historic weather observations for imaging.

Major CDMP Tasks 2007

National Environmental Satellite, Data, and Information Service

Hourly Surface Observations: imaging & keying

Hourly Precipitation Data: imaging & keying

Daily Cooperative Observations: imaging & keying

Mexican Daily Data: imaging & keying

Upper-Air Observations: imaging & keying

Defense Meteorological Satellite Program film: imaging

Heat Capacity mapping data Glacier Photos: imaging

Marine Geophysical Records: imaging & keying

Tsunami Event Gauge Records: imaging & keying

Historical Solar and Spectral Observations: imaging

Finnish & Swedish Lightship data: imaging & keying

Ionospheric observations: keying

Marine observations: keying

NOAA Library Rare Climate Publications: imaging

Monthly Weather Review: searchable indexing

Historical International Polar Year: imaging

Station history & metadata development

Subscription services




National Marine Fisheries Service

Lightship observations: imaging and keying

Data recovery on cetaceans: imaging and keying

Fish egg & larvae: keying

Reef Environmental Education Foundation: imaging

Historical plankton: keying

Historical aerial photography: image conversion

National Ocean Service

Shoreline Charts: vectorizing & georeferencing

Nautical Charts: imaging

Thunder Bay historical collections: imaging & keying

CA Marine Ecosystem Survey: imaging & keying

Geo-location of historical maps and nautical charts

National Weather Service

African Upper-Air Observations: keying

Uruguay & Chile surface data: imaging & keying

Atlantic Basin tropical cyclone “storm wallets”: imaging

Office of Oceanic and Atmospheric Research

WMO Pub 47: imaging

Hurricane reconnaissance: imaging and streaming video

European historical ship logbooks: imaging & keying

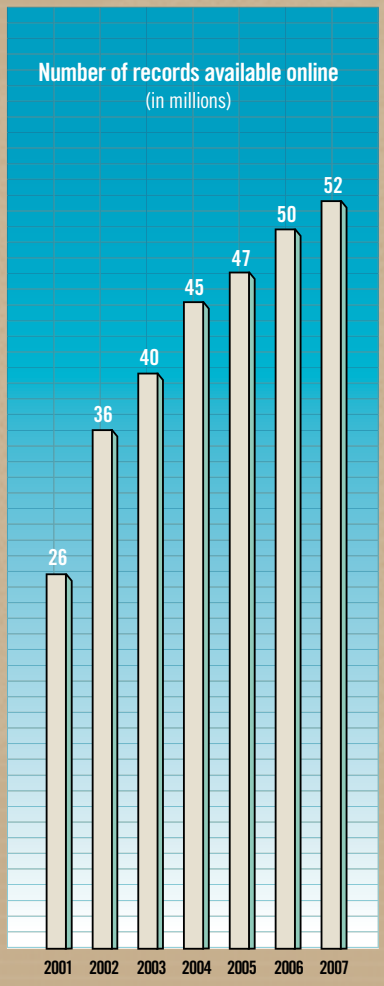
U.S. Regional Climate Centers

Database conversion and quality control

CDMP Major Program Achievements

The National Oceanic and Atmospheric Administration's Climate Database Modernization Program has just completed its seventh year. The demand for rapid and complete access to the nation's and world's climate data by researchers and global change scientists was a key motivation in the establishment of CDMP, which is managed through NOAA's National Climatic Data Center (NCDC) located in Asheville, NC. This program was initiated by Congress to assist NOAA in modernizing and improving access to the Nation's climate data and information.

Partnering with four private sector contractors, CDMP has placed approximately 52 million weather and environmental images online. These historic documents are now available to researchers around the world via the Internet. The amount of data online has grown from 1.75 terabytes in 2001 to over 9 terabytes in 2007. Major advances continue in making these data available on the web through a number of NOAA web sites (see URL list on inside back cover). In addition, during the past year over four million hourly weather records keyed through CDMP were integrated into NCDC's digital database holdings, extending the period of record for many stations into the 1890s. CDMP-keyed daily data records will soon extend this data period back as much as another 100 years.



CDMP PROJECTS HAVE CREATED SCORES OF NEW PRIVATE SECTOR, DATA ENTRY AND INFORMATION MANAGEMENT JOBS IN ECONOMICALLY CHALLENGED AREAS IN WEST VIRGINIA, KENTUCKY, AND MARYLAND.

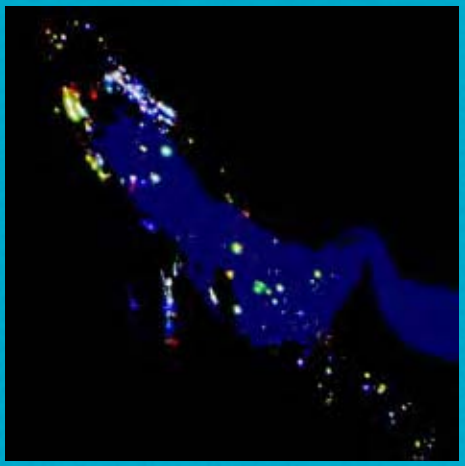
NOAA's CDMP Project Partners

The CDMP could not exist without the extraordinary efforts of people within NOAA and those in the private sector who do the keying, imaging, and database development. CDMP projects have created scores of new private sector data entry and information management jobs in several economically challenged areas in West Virginia, Kentucky, and Maryland. The project tasks supported by CDMP are well suited for the private sector. Many of these tasks have been shifted from government employees to CDMP contractors in the above mentioned states. Tasks performed by these contractors include the printing and distributing of the NCDC serial climate publications, managing accounts receivable, imaging and keying incoming records, hosting and maintaining online images, and providing expert personnel in support of various projects.

The three prime contractors for CDMP are Information Manufacturing Corporation, Rocket Center, West Virginia; SourceCorp, Mount Vernon, Kentucky; and HOV Services, Beltsville, Maryland. Excellent support is also provided by the NCDC on-site contractor, STG Corporation, whose staff prepares many of the data for shipment and performs extensive quality control on the returning data products. With over 60 projects ongoing, the contractors must remain focused and flexible to meet each project's requirements.

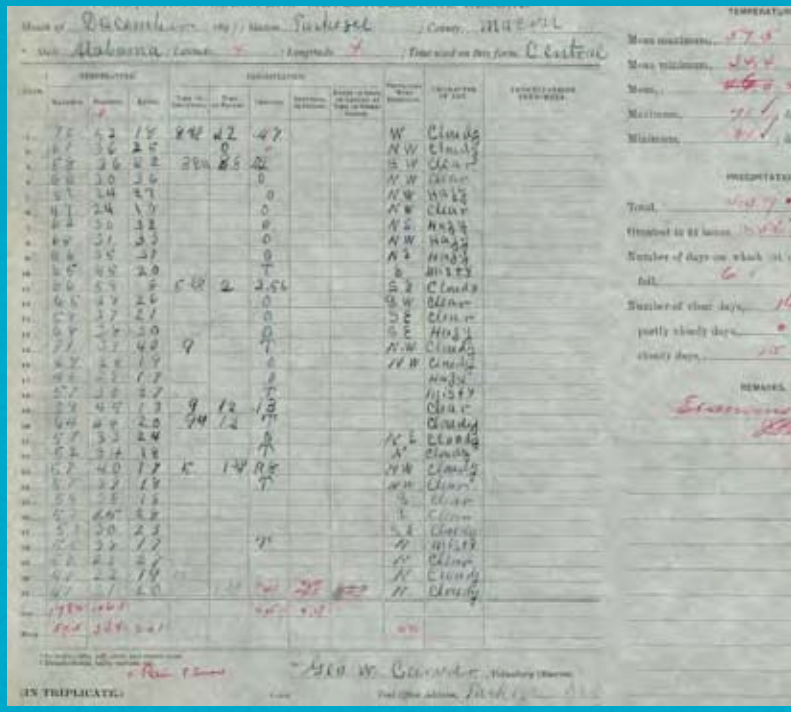
CDMP Goes Online

The images on these two pages are all available online through projects supported by CDMP.



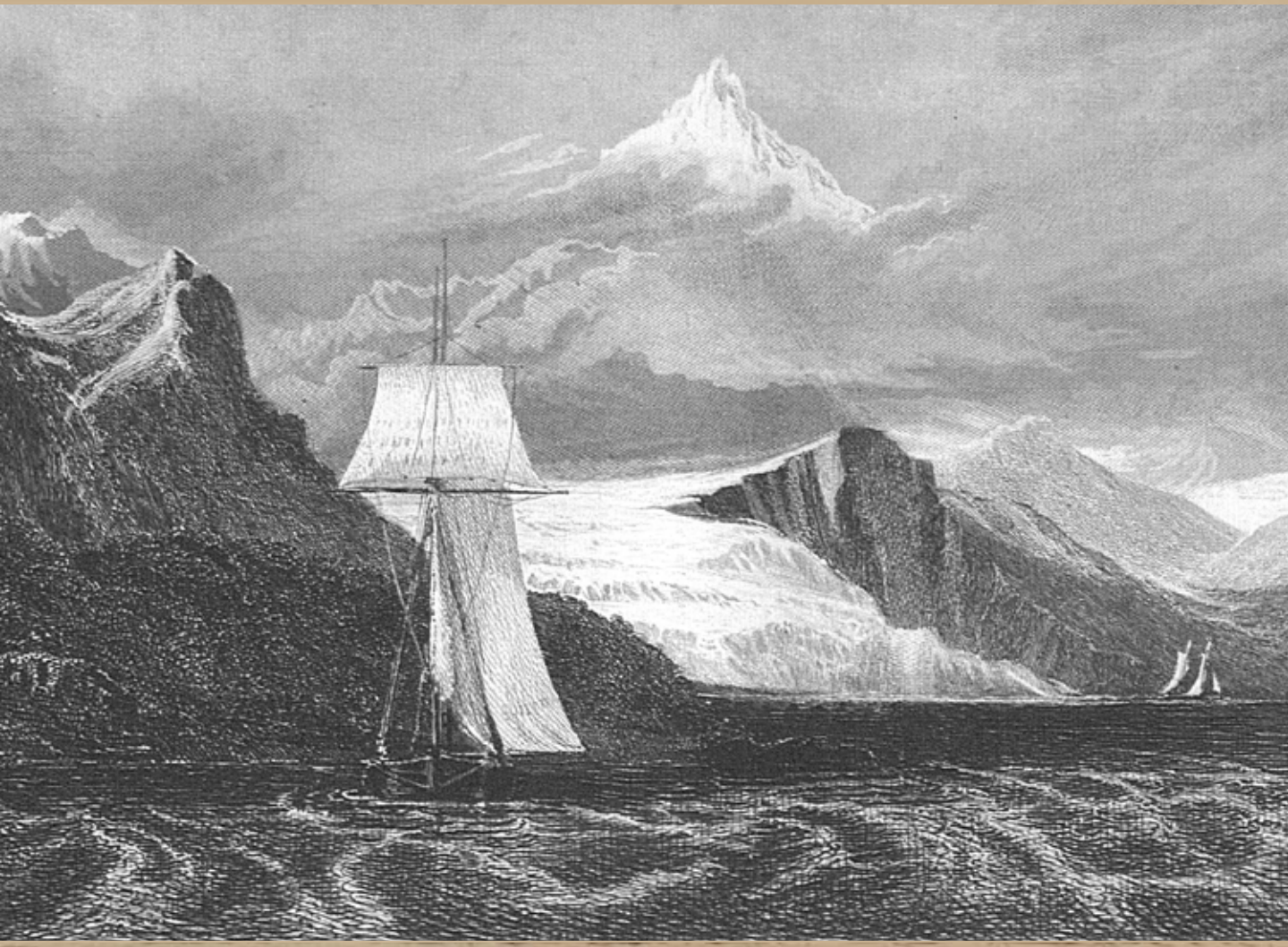
top left image – "Diagram of the Atmospheric Circulation in the Tropics," from an historic 1852 publication by famed Admiral M. F. Maury. This image is part of the NOAA Central Library's Rare Books collection, featured in NOAA's 200th Anniversary celebration.

middle image – Weather observations made by George Washington Carver in 1899, part of a NOAA Central Library collection of observations taken at the Tuskegee Institute from 1899 through 1954.



bottom left image – False-color satellite image showing natural gas flares around the Persian Gulf. NGDC researcher Chris Elvidge received a Department of Commerce Silver Medal Award for his work on this CDMP-funded project.

opposite page – The sailing ship H.M.S. Beagle, from a rare 1839 book detailing the exploits of the famous vessel as it sailed around the world between 1826 and 1836, from another historic document rescued via the NOAA Central Library Rare Books collection.



CDMP – Helping Scientists Understand Deadly Hurricanes

Damage along the Gulf coast from infamous Hurricane Camille in 1969, imaged through CDMP as part of the National Hurricane Center's "storm wallets" project.

From June through November, coastal residents are well aware of the forecasts and warnings produced by NOAA's Tropical Prediction Center/National Hurricane Center (NHC). But few know about the NHC's efforts to preserve valuable records of past storms.

For Atlantic basin tropical cyclones dating back to 1958, the NHC has compiled what's called a "storm wallet." These "wallets" are actually large expandable folders containing practically every piece of printed material imaginable for a storm – satellite photos, printouts of warnings and advisories, photographs of storm damage, newspaper clippings, and lots more. In all, there are over 500 tropical cyclones documented in these fascinating storm wallets.

Thanks to CDMP, the contents of these storm wallets, which were sitting on shelves at NHC, are being imaged and preserved on digital media.

background image – Spectacular image from inside the eye of Hurricane Katrina, taken from "Hurricane Hunter" aircraft at the time of the storm's peak intensity on August 28, 2005.

A flooded downtown Richmond, VA in the aftermath of the remnants of Hurricane Camille. These and other images from historic storms are available via the National Hurricane Center's website.

What's more, the NHC has placed the wallets that have been digitized so far on their web site, uploading new images as they are completed. Users of one of NOAA's most visited web sites may now access these records in just a couple of mouse clicks.

Just as folks know about the work of the NHC, they are also familiar with the dangerous and heroic exploits of the "Hurricane Hunters." The reconnaissance flights made directly into the heart of hurricanes and tropical storms by these NOAA and U.S. Air Force personnel are indispensable aids to the NHC forecasters, and to our nation.

When flying these reconnaissance missions, cameras and weather radars mounted on the Hurricane Hunter aircraft capture a record of the flight on videotape and, in earlier times, film. In addition, records of flight level meteorological data collected during many of the missions recorded on microfilm. Literally hundreds of these tapes and film reels exist, dating back to the 1950s.

As with the storm wallets, CDMP is at work to preserve these irreplaceable reconnaissance data. The tapes and film are being transferred onto DVD for better access and more reliable storage, and the flight level data are being keyed through CDMP into digital text files. Thus, CDMP is doing its part to help hurricane researchers better understand these deadly storms by making these reconnaissance data easily accessible and user-friendly.

CDMP – More Than Just Climate Data

While making historic weather and climate records available to the scientific community is a big part of its mission, the projects supported by the Climate Database Modernization Program aren't limited to climate data tasks. If valuable environmental data can be made more accessible, it's fair game for CDMP. The range of data extends from the depths of our world's oceans far into the atmosphere, and spans the entire globe.

One CDMP project with global implications is the digitization of marine geophysical records through NOAA's National Geophysical Data Center in Boulder, CO. With the help of CDMP, large collections of archived geophysical data on microfilm and paper are now available as scanned images useful for determining physical characteristics of the ocean floor. These include digital images of seismic reflection profiles, generated by bouncing a sound source off the ocean floor and measuring the return. Seismic reflection profiles characterize the structure of sediments beneath the seafloor, providing an image of the layers of the ocean floor sediments. These images are helping the U.S. and other countries determine their Extended Continental Shelf (ECS), the area beyond the 200 nautical miles provided to coastal states under international law. The process to determine the outer limits of the ECS requires analysis of data describing the depth, shape,

Dressed fish on shore at Cape Cod, MA in 1891, from the historic records of the former U.S. Fish Commission. NOAA's National Marine Sanctuary Program is using these Fish Commission records, made available through CDMP, to help construct an historic marine database.

and geophysical characteristics of the seabed and sub-sea floor, as well as the thickness of the underlying sediments. A successful submission to the United Nations defining the ECS gives international support to a country's sovereign rights in that area for economic potential such as oil resources, minerals, and sedentary species. With the help of the images produced through CDMP, this process has become far easier.

Not only is CDMP helping provide access to physical characteristics of the ocean floor, the program is also helping scientists understand long-term changes in the life above that floor. CDMP has made possible the imaging of historic records of the former U.S. Fish Commission. These records consist of an extensive collection of publications, research notes, scientific survey expedition logbooks, photographs, and published statistics relating to commercial fishing, all resulting from the research and work performed by the commission in the late 1800s. The information contained in these documents is vital for helping marine scientists identify factors that have affected marine life since the time of the Fish Commission's initial research. Prior to CDMP, these deteriorating records were mostly hidden in obscure stacks in the National Archives, and were unavailable to researchers on a systematic basis. Now that CDMP is imaging these historic documents, NOAA's National Marine Sanctuary Program is using the data sets to help provide a historical baseline for monitoring changes in protected marine sanctuaries, and to try and understand how the marine environment has changed over time. In so doing, CDMP is assisting in the preservation of marine life in coastal sanctuaries all along the U.S. coastline.

This seismic reflection profile reveals the structure of the ocean floor and subfloor. These incredibly detailed profiles are created from data digitized through CDMP.

CDMP – Helping to Understand the Polar Climate

The polar regions have profound significance for the climate, ecosystems, and ultimately, its human inhabitants. However, we still remain remarkably ignorant of many aspects of how polar climate operates.

To that end, scientific communities around the world have joined to establish the Fourth International Polar Year (IPY). This global, interdisciplinary research program focusing on the polar regions will run from March, 2007 though March 2009.

To support NOAA's involvement in the IPY, CDMP and the NOAA Central Library have teamed to create the NOAA Historical Polar Research Collection web site. This site displays the library network's unique online resources on exploration and research in polar regions. The collection includes selected library holdings from the first (1881-1883) through the third (1957-1958) International Polar Years, many of which have been imaged and placed online through CDMP, and also contains links to other polar region research sites and documents.

This beautiful artist's rendering of the Antarctic is part of NOAA's International Polar Year collection (cover page from "The Worst Journey in the World: Antarctic, 1910-1913" by Apsley Cherry-Garrard).

Web Addresses for NOAA Organizations:

National Oceanic and Atmospheric Administration (NOAA)
www.noaa.gov

NOAA's National Environmental Satellite, Data, and Information Service (NESDS)
www.nesdis.noaa.gov

NOAA's National Climatic Data Center (NCDC)
www.ncdc.noaa.gov

NOAA's National Geophysical Data Center (NGDC)
www.ngdc.noaa.gov

NOAA's National Oceanographic Data Center (NODC)
www.nodc.noaa.gov

NOAA's National Ocean Service (NOS)
www.nos.noaa.gov

NOAA's National Marine Fisheries Service
www.nmfs.noaa.gov

NOAA's National Weather Service
www.nws.noaa.gov

NOAA's Office of Oceanic and Atmospheric Research
www.oar.noaa.gov

Selected Project Specific URL's

NOAA Shoreline Data Explorer
www.ngs.noaa.gov/newsys_ims/shoreline/index.cfm

NOAA Coastal Explorer
coastalexplorer.imcwv.com

Defense Meteorological Satellite Program (DMSP)
www.dmsp.ngdc.noaa.gov/dmsp/index.html

NOAA CENTRAL LIBRARY IMAGING PROJECTS
Daily Weather Maps (1871-2002)
docs.lib.noaa.gov/rescue/dwm/data_rescue_daily_weather_maps.html

U.S. Signal Office Annual Reports (1861-1891)
docs.lib.noaa.gov/rescue/cso/data_rescue_signal_corps_annual_reports.html

MONTHLY WEATHER REVIEW
Coast and Geodetic Survey Annual Reports (1852 -1950)
docs.lib.noaa.gov/rescue/cgs/data_rescue_cgs_annual_reports.html

U.S. Fish Commission Annual Reports (1871-1940)
docs.lib.noaa.gov/rescue/cof/data_rescue_fish_commission_annual_reports.html

"Taking an Observation at the Pole" from "The South Pole" by Roald Amundsen, part of NOAA's International Polar Year photo collection imaged through CDMP.